

# Missouri Department of Natural Resources Land Reclamation Program



1999 & 2000  
**Biennial Report**

# Letter from the Director

**T**he Missouri Department of Natural Resources' Land Reclamation Program (LRP) plays an integral part in protecting and preserving Missouri's natural resources. The program is responsible for regulating today's mining industry and for correcting health, safety and environmental problems associated with Missouri's legacy of abandoned mines.

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Front cover photo: *Wildlife and people benefit from effective reclamation at the Upper Cedar Creek Project in Boone County. Recreational opportunities increase as wildlife habitat is improved.*

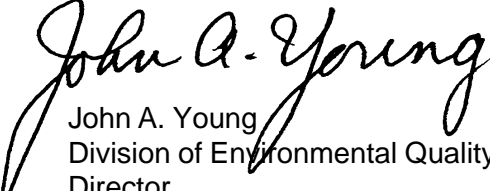
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When properly reclaimed, these areas can once again be used as farm lands or wildlife areas. Wildlife habitat remains a primary concern of the Land Reclamation Program. Whenever possible, abandoned mines are reclaimed with wetlands, native prairie grasses and trees that are part of Missouri's history. Reclaiming mine land also protects the environment by preventing toxic or acid mine drainage and soil erosion.

As a result of the decline of coal mining in Missouri due to the use of low sulfur coal from western states, the functions of the Land Reclamation Program are slowly evolving more toward the industrial mineral mining that is increasing within the state. These are primarily limestone, clay and sand and gravel mines all across our state. The Land Reclamation Program is committed to future changes that may be necessary to assure all mining and reclamation activities are conducted in an environmentally sound manner.

This biennial report provides information and statistical summaries concerning the activities and business of the Land Reclamation Program and its efforts to reclaim mined land during fiscal years 1999 and 2000.

For more information, contact the department's Land Reclamation Program at 1-800-361-4827 or (573) 751-4041.

  
John A. Young  
Division of Environmental Quality  
Director

# Introduction

**M**ining activity in Missouri began as early as the 1740s. Early settlers used the state's reserves of lead, iron and industrial commodities such as limestone, sand and gravel. A new chapter unfolded in the 1840s with the arrival of coal mining in the state. From the date of the first mining until the enactment of Missouri's first strip mine legislation in 1971, nearly 67,000 acres were left unreclaimed by coal-mining operations, and an estimated 40,000 acres were left abandoned through the mining of other commodities. Missourians were left with acid mine drainage, dangerous highwalls, hazardous water bodies, dangerous mine openings, unvegetated and barren spoils, coal waste, soil erosion and stream sedimentation.

To offset the dangerous and unproductive after effects of mining, Missouri enacted legislation in 1971. *Senate Bill 1* also known as *Strip Mine Law*, effective March 28, 1972, regulated coal, tar sands and barite mining. *House Bill 519*, effective Jan. 1, 1972, regulated limestone, sand, gravel and clay pits. The Land Reclamation Commission was formed to enforce these laws, and the Land Reclamation Program was created to administer them, acting as the commission's staff. Subsequently, the program became part of the Missouri Department of Natural Resources' Division of Environmental Quality.

Through growing national concern over the environmental degradation caused by coal mining, Pub-

lic Law 95-87 was passed in 1977 by the U.S. Congress. This law, also known as the *Surface Mining Control and Reclamation Act* or SMCRA, dictated specific requirements for the reclamation of coal mined land, and also established state regulatory authorities for the enforcement and monitoring of surface mine reclamation activities. The act also established programs and funding for reclaiming coal mine lands mined prior to May 2, 1977. On May 3, 1978, the Legislature amended Missouri's *Strip Mine Law* establishing Chapter 444.535 RSMo, commonly referred to as the *Interim Program Law*. Requirements of this law include the following:

- A. Topsoil must be removed and replaced to a minimum six-inch depth;
- B. All prime farmland soils must be removed and replaced to 40-inch depth;
- C. All mined land must be reclaimed to an equal or better land-use capability;
- D. Mined land must be backfilled and graded to approximate original contour;
- E. Coal waste and other acid-or toxic-forming material must be covered with a minimum of four feet of non-toxic material; and
- F. A permanent vegetative cover compatible with the premining land use must be established.

On May 17, 1982, the Missouri Legislature passed the *Surface Coal Mining Law* (Chapters 444.800 - 444.970) to match federal standards established in SMCRA. The law made changes to

*Clay mine site in Osage County during mining and after reclamation.*







*Stable riparian areas provide important wildlife habitat, reduce erosion and improve water quality of reclamation projects. Protecting water quality is an important component of DNR reclamation success.*

the permitting process and granted the Land Reclamation Commission the authority to administer the abandoned mine land program. Coal companies were now required to submit baseline information on the hydrology, geology, soils, fish and wildlife, and cultural resources of the proposed mining area along with a detailed description of the proposed operation and reclamation plan. The most significant change to the reclamation requirements was that prime farmland soils must be removed and replaced to a 48-inch depth. These requirements, known as the *Permanent Program Law*, continue in effect to the present day.

Missouri's *Surface Coal Mining Law* (Chapters 444.800 - 444.970) was also amended in 1993 to address deficiencies in Missouri's bonding provisions to conform with federal requirements.

The *Land Reclamation Act* and the regulations governing tar sands and barite mining remained essentially unchanged during the evolution of the coal mining standards. In 1990 the passage of *House Bill 1584* amended the *Land Reclamation*

*Act* to encompass all non-coal surface mining activity. This includes limestone, sand, gravel, clay, tar sands and barite mining. Sandstone, granite and traprock quarries also became subject to mining regulations. The revisions require a much more thorough description of the method of operation and reclamation. The public was also included in the permitting process for the first time, via a public notice and comment procedure. In addition, the right of anyone affected by a non-compliance at an operation could request a hearing before the Land Reclamation Commission. Time frames requiring operators to complete reclamation in a timely manner were established. Bonding fees were significantly increased to ensure the state could complete reclamation in the event a permit is revoked. Grading to a traversable topography, as well as replacing 12 inches of topsoil were also required. Following these amendments, rules and regulations were developed that underwent the formal rulemaking process and became effective Feb. 6, 1992.

# Highlights for 1999 and 2000

The Department's Land Reclamation Program (LRP) continues to make steady progress in addressing Missouri's Abandoned Mine Land (AML) problems. During this two year period reclamation or design work occurred on 336 acres of AML containing health and safety problems. Reclamation activities were completed on 66 acres including the closure of 3 dangerous mine openings. Five reclamation projects are featured in this year's report. These include the Bear Creek Project, the Bill's Coal/Moore's Branch Project, the Fulton Project, the Turner/Valle Project and the Upper Cedar Creek/319 Project. These projects exemplify the work that is conducted through Missouri's AML program.

**1** For the two-year period reclamation was completed on 675 acres of land utilized for industrial mineral mining. The post mining land uses are agricultural, wildlife habitat, development or water impoundment.

**2** In Nov. 17, 1999 the Land Reclamation Commission entered into a settlement agreement with the New York Frontier Insurance Company to reclaim three coal mines where permits were revoked. The mining companies that defaulted on their obligations to reclaim are: Riedel Energy, Inc.; North American Resources, Inc., Silver Creek Mine and North American Resources, Inc., Foster Mine. Reclamation activities at the Silver Creek Mine are 90 percent complete.

**3** The Land Reclamation Commission entered into a consent agreement with Alternate Fuels, Inc. on Aug. 13, 1999 to consolidate enforcement actions at their Blue Mound Mine site, reduce fines to \$75,000 of which \$40,000 was suspended. The company failed to meet the terms of the agreement and the LRC assessed the suspended penalties. Alternate Fuels, Inc. did not pay within the timeframes allowed and collection has been referred to the Attorney General's Office. The company continues in violation of the settlement agreement.

The Commission is evaluating the performance of Alternate Fuels, Inc. and how reclamation is being conducted and what progress is being made in

the abatement of the environmental problems created by the company. A determination may be made by the Commission during the summer of 2001 on compliance with the consent agreement.

**4** The Land Reclamation Commission entered into a consent agreement with Midwest Coal on July 22, 1999, to satisfy an order to show cause at their Tiger Mine site. The show cause order was based upon the establishment of a pattern of violations based upon the company's mishandling of coal and/or coal waste materials.

The consent agreement has been complied with to date. However, new patterns of violation have since been created, and it will be necessary to address these with the company in either a new consent agreement or other method as determined by the Commission.

**5** In FY 1999, the LRP began administering the AML Emergency Program in Missouri on behalf of the Office of Surface Mining. During the two year period LRP conducted five emergency investigations relating to possible mine subsidence under private homes in St. Louis. These investigations revealed that mine subsidence was not the cause of the settlement problems, therefore no emergency work was completed.

**6** During the two-year period, 432 acres of reclaimed coal lands were granted Phase III release by the Land Reclamation Commission. As coal mining in the state decreases, mining companies have accelerated reclamation to limit their reclamation liabilities. The LRP conducts thorough reviews of these reclaimed lands to insure compliance with performance standards.

**7** Initial reclamation work was completed on a 60-acre coal bond forfeiture site in Howard County. The work consisted of burying coal waste, repairing water impoundments, removing trash and abandoned structures, replacing soil materials and seeding of vegetation. Universal Coal and Energy forfeited bonds totaling nearly \$1.2 million on 1,417 acres permitted for coal mining that were in various stages of reclamation. The state is now responsible for completing the reclamation on these lands. Reclamation will continue on other sites associated with the forfeiture as design work is completed.



## MISSOURI DEPARTMENT OF NATURAL RESOURCES

*Larry P. Coen*, Staff Director  
Land Reclamation Commission

### LAND RECLAMATION COMMISSION

#### PUBLIC MEMBERS

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Vice-Chairman

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*Carol Wicks, Ph.D.*  
Member

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Department of Conservation

*Mimi Garstang*  
State Geologist

*Edwin Knight*, Staff Director  
Clean Water Commission

## Land Reclamation Mission

**To assure beneficial restoration of  
mined lands and to protect public  
health, safety and the  
environment from the adverse  
effects of mining within the state  
of Missouri.**

# Land Reclamation Program and Administration Organization

**T**he Land Reclamation Program (LRP) was originally established in the *Omnibus State Reorganization Act* of 1974. This act created the Department of Natural Resources and placed the Land Reclamation Commission (created by Missouri Statutes Chapter 444) under its auspices. The Land Reclamation Commission directs the staffing and operations of the program within the department's Division of Environmental Quality.

The seven-member commission includes three statutory members - the state geologist, the director of the Missouri Department of Conservation and the staff director of the Clean Water Commission. With Senate approval, four public members are selected by the governor. Of these four, only two may be of the same political party. Only one member of the commission may have a direct link with the mining industry.

The Land Reclamation Program consists of the administrative unit, which includes the director's office and two distinct sections, the mining section and the reclamation section. A total of 37 full-time staff members are divided between the sections and the Director's office. Together, staff members are responsible for regulatory oversight of all surface mining and reclamation of abandoned mine lands in Missouri. Through the years those responsibilities have increased as the statutory laws have increased. The challenges and accomplishments of the LRP staff are described in the following pages.

# Coal Mining Activities

Over recent years, Missouri coal production has declined from 4.2 million tons in 1987 to approximately 0.4 million tons during 2000 (Table 1). This decline is largely due to industry demands for low-sulfur, western coal needed by power plants in order to meet stricter emission standards required by the federal *Clean Air Act*. Other factors associated with declining coal production in the state are reclamation and transportation costs. Most of Missouri's coal reserves contain relatively high sulfur content, ranging from 2 to 7 percent by weight. Missouri coal has a relatively high British Thermal Unit (BTU) compared to western coal. In recent years, some power plants have opted to mix Missouri's coal with lower BTU western coal in order to increase energy production without exceeding sulfur emissions.

Over the last two fiscal years, most of the coal removal efforts have been concentrated in a small area in southwestern Missouri where coal seams contain lower levels of sulfur. During this time period, the LRP issued one new coal mining permit, which covered 205 acres of land in Bates County. At the end of the 2000 fiscal year, only two of the 14 active coal mines were still producing coal. At that time the remainder of the mines were in various stages of reclaiming the land to regulatory standards.

LRP staff closely monitors coal mining operations, including both coal removal and reclamation activities. Declining coal production in no way decreases the responsibilities of the LRP. Monthly inspections of each mine continue to be performed long after the last ton of coal is removed. Revisions to permits and reclamation changes continue to be submitted for review and approval, as operators fine-tune their post-mining land use plans. Bond re-

lease requests increase in number and in size as more ground is reclaimed to acceptable standards. In effect, reclamation activities consume a far larger percentage of time and effort than the actual mining of coal itself.

## Coal Permitting

Staff members are responsible for reviewing permit revisions and new permit applications. A summary of the permit actions for fiscal year 1999 and fiscal year 2000 are provided in Table 2. LRP staff are professionally trained in specific technical areas and are responsible for reviewing technical plans with respect to their area(s) of expertise. Technical areas that must be reviewed include engineering, blasting, soil science, geology, hydrology, revegetation, land use plans, fish and wildlife protection, cultural and historical resources, and reclamation technology. Staff members review all coal permit applications for adequacy and recommend approval or denial. Staff conduct regular evaluation of existing permits and also provide technical assistance to the mining industry and the public.

A thorough review of surface coal mining permit applications, permit revisions, and other permit-related actions is necessary to ensure that all requirements of the law and regulations are met. This includes determining that all applications, as well as the review process itself, meet all legal and

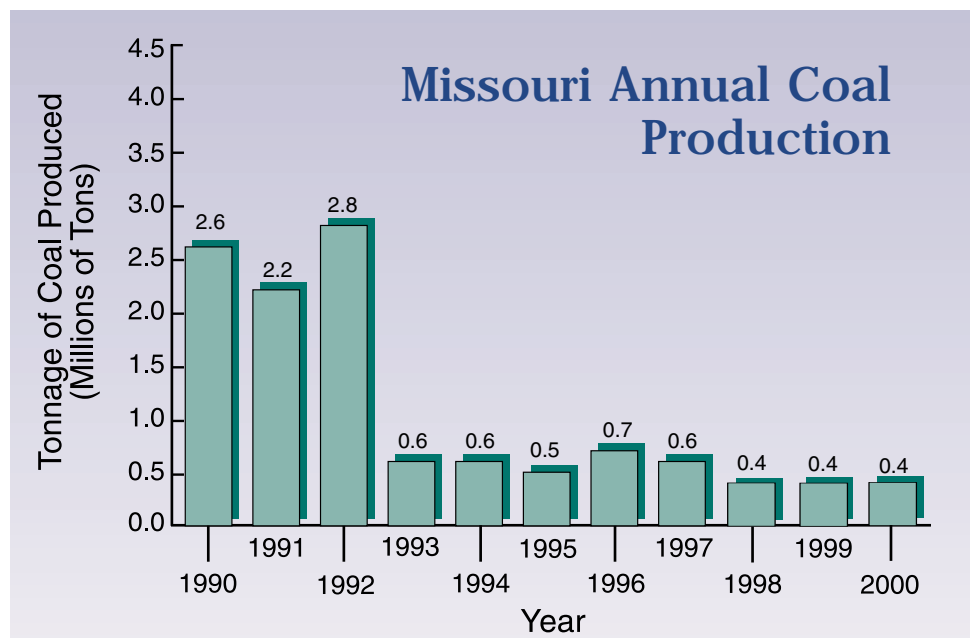


Table 1



administrative requirements. The permitting requirements for coal mining are extensive, requiring careful evaluation of diverse and comprehensive environmental topics such as soil characteristics, surface and subsurface water quality controls, fish and wildlife information, cultural resources and land use planning. Reviews also focus on specific details such as engineering designs for sedimentation ponds and water diversions, blasting plans and hydrogeologic data to determine the probable hydrologic consequences of mining. Other permitting responsibilities include evaluating each applicant's compliance history with past mining activities and ensuring that all public review requirements are fulfilled. Staff members also coordinate with other regulatory agencies to ensure that the company proposing to conduct the mining activity has obtained other necessary environmental permits.

Reclamation begins immediately after coal is removed from a strip mine pit. Regulations dictate that a pit must be completely backfilled and graded

no later than 180 days after coal removal. Topsoil must then be redistributed within an additional 270 days. The area must then be seeded during the first available growing season, with vegetation sufficiently established to control erosion by the end of the second year. Sediment ponds, diversions, explosive storage areas and maintenance pads also are subject to reclamation requirements once they become inactive or are no longer needed as part of the mining operation. Only when these requirements are met can an operator obtain a release of reclamation liabilities.

All coal operators are required to post reclamation bonds. Bonding rates presently are \$2,500 per acre for mined land and \$10,000 per acre for any area used to store or process coal. An operator can submit a written request for release of bond liability if all reclamation requirements for a given area have been met. The area is field checked by an inspector who then reports his conclusions to the Land Reclamation Commission. The commission will then either approve or deny the request.

Bond release is a complex process. Three stages of criteria, termed Phase I, Phase II and Phase III must be met before an operator gains complete release of liability. An area qualifies as Phase I release upon completion of backfilling and grading, topsoiling, drainage control and initial seeding. Phase II release can be granted as soon as a permanent vegetative cover sufficient to control erosion is in place. Phase III release is gained once all terms and conditions of the approved reclamation plan are met, established vegetation is compatible with the post-mine land usage and all vegetative standards for success are met. This process, in the most favorable of circumstances, takes a minimum of seven years to complete.

Reclamation rarely proceeds unhindered. Oversight, improper land management, and unforeseen problems all contribute to delays in obtaining bond release. From 1982 to 1995, the number of mined and reclaimed ground that LRP has regulatory responsibility for increased. Since 1995, mining has decreased and companies have completed reclamation, thereby decreasing the mined disturbed acres under the responsibility of LRP. Table 3 illustrates this fact. Since the inception of the Permanent Program rules and requirements in 1982

## Surface Coal Mining Permit Actions for

Fiscal Year  
1999 and 2000

	State Fiscal Year 1999	State Fiscal Year 2000
New surface mining permit applications received.	0	1
New surface mining permit applications approved.	1	0
New exploration permit applications received.	1	0
New exploration permit applications approved.	0	1
Permit Amendments received (permit revisions, permit renewals, permit transfers).	117	113
Permit Amendments finalized (approved, withdrawn, denied).	103	87

Table 2



through fiscal year 2000, 42,520 acres have been permitted for coal mining activities. Of this total, 19,579 acres, or 46 percent of the land actually was disturbed. Phase I release has been granted on 13,283 of these acres, or 68 percent of the disturbed land. Phase II release has been granted on only 11,627 acres, or 59 percent of all disturbed acreage. Phase III release amounts to 8,074 acres, or 41 percent of all disturbed land mined since 1982.

Combined with many other duties, LRP personnel anticipate that monitoring reclamation progress and evaluating bond release requests will present a challenging work environment for many years to come. As coal production declines, companies will become increasingly compelled to concentrate their efforts toward obtaining bond releases. This trend has been occurring over the past four years (Table 3). Even if all mining ended today, at the present rate of bond release it would take another two to five years for all Phase I to be released, an additional two to five years for all Phase II to be released, and an additional four to seven years for all Phase III to be released.

## Coal Mining Inspection

Reclamation activities are as closely monitored as coal removal activities to ensure that that required performance standards are met and the reclamation plans approved in the companies' mining permits are followed.

Coal mine inspections are performed monthly. On-site inspections serve three primary functions:

1. Ensure an operation is functioning in a manner consistent with applicable state laws;
2. Ensure an operation is fully complying with the conditions of the permit; and
3. Provide a public record on the status of mining and reclamation at a site.

Two styles of inspections are done, termed a complete and partial. Complete inspections are re-

## Mined Ground versus Bond Release Acreage

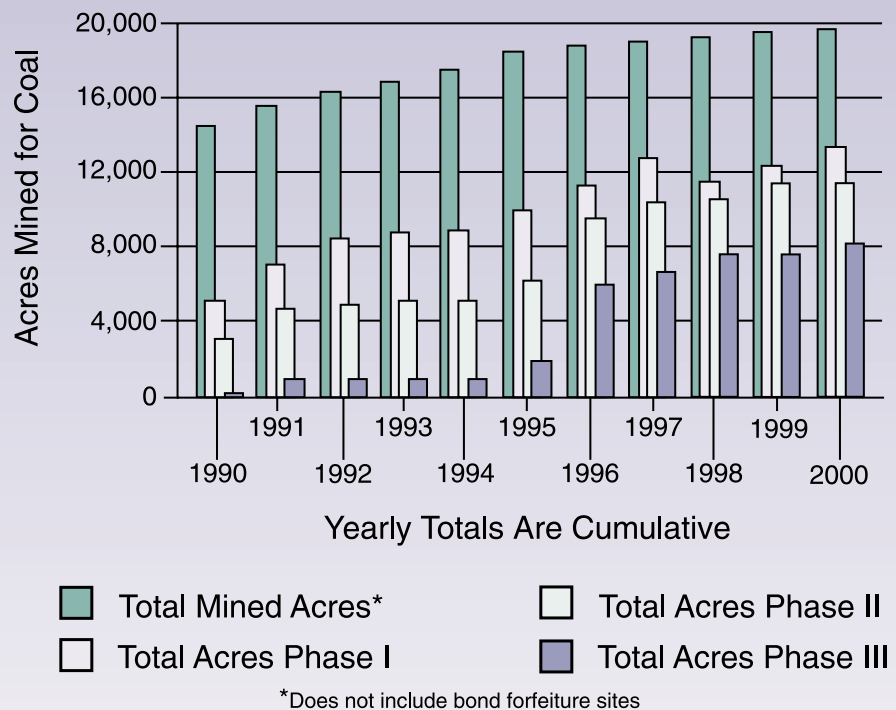


Table 3

quired once per calendar quarter. They involve complete review of an operator's compliance with all permit conditions and state statutes. As the name implies, partial inspections are a review of an operator's compliance with some of the permit conditions and state statutes. Aerial inspections can be substituted for partial inspections.

The many aspects of a mining operation are scrutinized during an inspection to ensure the following:

- 1) Mining occurs within the confines of the permit;
- 2) Topsoil is being salvaged and stockpiled;
- 3) All runoff from mined areas enters sedimentation ponds;
- 4) Pits and other areas of mine disturbance are promptly backfilled and graded;
- 5) Topsoil is replaced; and
- 6) Vegetation is quickly reestablished to control erosion.

Monthly inspections continue long after an operation ceases mining coal. Continued monitoring ensures that reclamation continues in an expedient manner and that all conditions of the reclamation plan are followed. Only when an operator gains approval for a Phase II release (vegetation sufficient to control erosion) does the inspection frequency decrease from monthly to quarterly. This

level of release commonly is not reached until several years after mining ceases.

## Coal Mining Enforcement

One of the results of doing inspections is issuing enforcement actions. "Notices of Violation" are frequently issued when an operator is out of compliance with the conditions of the permit or with state statutes. They include both minor and major infractions of the law, and give the operator time to correct the violations. "Cessation orders" are more serious. They are issued when a condition or practice at the mine site constitutes imminent danger to the health and safety of the public or imminent environmental harm to land, water or air resources. It may require the immediate cessation of mining until the problem is corrected. Cessation orders, because of their seriousness, require immediate abatement by the operator. Failure to do so may lead to revocation of the permit. Cessation orders also are issued for failure to abate a notice of violation within the required time frames.

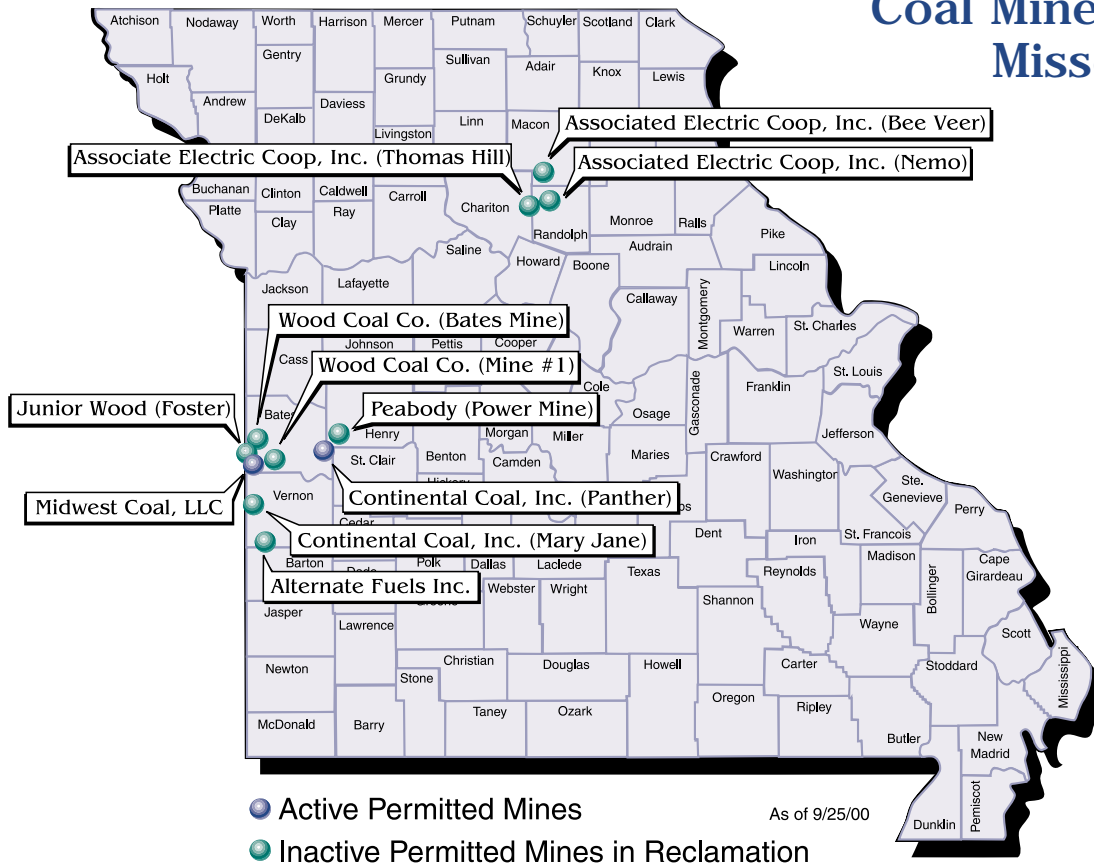
If Cessation Orders are not abated in a timely manner, the next enforcement action is a "Show-Cause Order". This means the operator is ordered to show why their permit should not be revoked and the reclamation bond forfeited. Show-Cause Orders may also be issued for other reasons such as for patterns of violations and uncorrected delinquent reclamation.

Table 4 displays enforcement actions issued during fiscal year 1999 and fiscal year 2000. The 29 violations issued for failure to follow the approved method of operation include mine-related activities such as topsoil removal, blasting, sediment control, pond construction and observance of buffer zones. Failure to follow the approved method of reclamation includes violations issued for exceeding specified time frames for backfilling and grading pits, covering acid-forming spoil and top soiling and reseeding. Failure to maintain constructed features relates to the deterioration of mine support facilities such as sedimentation ponds, diversions, haul roads and stockpiles. Administrative violations include failure to submit permit renewals, certificates of insurance, reclamation fees, water monitoring records and blasting notices within the required time frames.

1999 – 2000 Inspection and Enforcement Activity		
Coal		
Show-Cause Orders		3
1999	2	
2000	1	
Notice of Violation		68
Operational	29	
Reclamation	14	
Maintenance	11	
Administrative	14	
Cessation Orders		15
Imminent Danger	0	
Failure to Abate Notice of Violation	15	
Number of Inspections for 1999 and 2000		634
1999	307	
2000	327	
Number of Acres Released from Bond for 1999 and 2000		
Phase I	1,766.7	
Phase II	825.8	
Phase III	917.8	
Industrial Minerals		
Notices of Violation for 1999 and 2000		47
Administrative	20	
Operational	27	
Number of Inspections for 1999 and 2000		607
1999	291	
2000	316	
Acres Released from Bond for 1999 and 2000		675
1999	321	
2000	354	

Table 4

## Coal Mines in Missouri



## Coal Bond Forfeiture

Each permitted coal company in Missouri is required to provide financial assurances to ensure reclamation of the site after coal removal. Upon completion of reclamation to applicable regulation standards, the coal company receives a release from the Land Reclamation Commission related to reclamation liability and the financial assurances or bonds are released. Should a coal company fail to provide reclamation to applicable regulation standards the bonds are forfeited to the LRP and these bonds are used to provide reclamation to the site mined by the coal company.

The Coal Mined Land Reclamation Fund is another source of funding dedicated to the reclamation of sites, which were not adequately reclaimed by the coal company. The monies for this fund are attained through a surcharge placed on each ton of coal mined by active coal mining companies in Missouri.

The Land Reclamation Program completes the design work on the forfeited sites. The proposed work is then publicly advertised and bid out through the Office of Administration. Inspection of the con-

struction contract is either conducted by LRP staff or by a private firm. This reclamation removes acidic impoundments, dangerous highwalls, coal refuse material and barren lands to be replaced with small lakes and ponds, vegetated pastures and prime farmland areas. The results will provide wildlife habitats, farming and grazing habitats and recreational settings that will be beneficial and enjoyable to landowners for many years.

## Summary of Bond Forfeitures

Between 1981 and 1987, there were eight separate coal mining companies that ceased business operations and failed to provide reclamation to applicable regulation standards. These companies forfeited bonds on approximately 4,000 acres of land under permit. In April 1998 initial reclamation was completed at Bill's Coal in Vernon County. Since Abandoned Mine Land funds were used in the reclamation of the Bill's Coal site due to a funding deficiency this project is discussed further on Page 20. This was the final project to be completed related to companies who forfeited bond between 1981



*Associated Electric Coop, Inc. completed reclamation at this site in Randolph County after they mined the area for coal.*

and 1987. The Land Reclamation Program provides maintenance on reclaimed sites until a liability release is granted from the Land Reclamation Commission.

Between 1990 and 1999 an additional eight separate coal mining companies ceased business operations and failed to provide reclamation to applicable regulation standards. These companies forfeited bonds on approximately 4,300 acres of land under permit. Initial reclamation has been completed for the Amearth Project located in Vernon County. Of the seven projects forfeited between 1990 and 1996 reclamation activities have been completed on two of them. These two projects have received a complete liability release. Due to the size of permitted area related to Missouri Mining, over 1,800 acres, reclamation of these lands will take several years with several construction contracts being utilized.

In 1995 Universal Coal and Energy forfeited bonds totaling nearly \$1.2 million on 1,417 acres located in Howard and Randolph Counties. Many of the acres do not require extensive reclamation work but require repair of pond structures, elimination of erosion and establishment of vegetation. During fiscal years 1999 and 2000 the LRP completed initial reclamation activities on three sites and the final design was completed on a fourth site associated with Universal Coal & Energy forfeiture.

The largest of these sites consisted of the 60 acre Coal Preparation Plant Project in Howard County. The design was completed in March 2000 with reclamation beginning in July 2000. The work consisted of burying coal waste, repair of water impoundments, removing trash and abandoned structures, replacement of soil materials and seeding of vegetation. Reclamation will continue on other sites associated with the forfeiture as design work is completed.

On Nov. 19, 1999, the New York Frontier Insurance Company entered into an agreement with the Land Reclamation Commission to reclaim three surface coal mine sites that were left abandoned by North American Resources, Inc. and Riedel Energy, Inc., Fred A. Lafser, President. The permit holder abandoned the Silver Creek Mine in Randolph County (392 acre permit), the Foster Mine in Bates County (274 acre permit) and the Perry Mine in Ralls and Monroe Counties (1912 acres on seven permits). A reclamation plan for the Silver Creek Mine, located near Yates, was submitted by Frontier Insurance and the approved reclamation plan was initiated in the spring of 2000. Completion of the required work is anticipated by December, 2000. A reclamation plan for the Foster Mine has been received and is currently under review. It is planned to begin work at this mine site in 2001.

The New York Frontier Insurance Company agreed to perform the reclamation at these three sites in lieu of the Land Reclamation Commission collecting on the performance bonds that has been posted in order to guarantee proper reclamation. This approach has accelerated both the planning stage as well as the on ground reclamation. If the Land Reclamation Program were to have collected the bond funds and performed the work as a typical state reclamation project, the starting date would have been delayed and the amount of money spent per acre of reclaimed ground would also have been increased, thereby increasing both time and monetary costs to the state. Greater efficiencies of time and money were realized by allowing the bonding company to provide the planning and reclamation services.



# Industrial Mineral Mining Activities

## Industrial Mineral Permitting

**A**mendments made in 1990 to the *Land Reclamation Act*, Missouri's industrial minerals mining law, increased the requirements to be met for completing industrial mineral permit and reclamation processes. However, the complexity of permitting and reclamation requirements for industrial minerals still remain far below those required under current coal mining law.

Industrial mineral mining permits are issued for a one year period. The industrial mineral permits must be continually renewed until the Land Reclamation Commission deems all mined land covered by the permit is fully reclaimed. Approximately 600 new or renewed permits were issued in the past two years. Since some permits contain multiple sites, the number of permitted sites is substantially higher as noted in Table 5. In addition to the new and renewed permits, staff spent a considerable amount of time reviewing other permit actions, which include permit transfers, expansions and amendments. Information regarding the number and types of industrial mineral mining sites covered by LRP permits during the past two years is presented in Table 5.

The fees collected from industrial mineral permits are used to conduct the necessary regulatory functions. As of May 1998, these functions include managing both the permitting, inspection and enforcement of industrial mineral permits. Finding a way to complete reviews on approximately 300 permit actions each year while conducting necessary inspections continues to be a challenging goal for the program.

The Industrial Minerals (IM) permitting program continues to look for ways to improve its methods of helping the public to understand the IM permit-

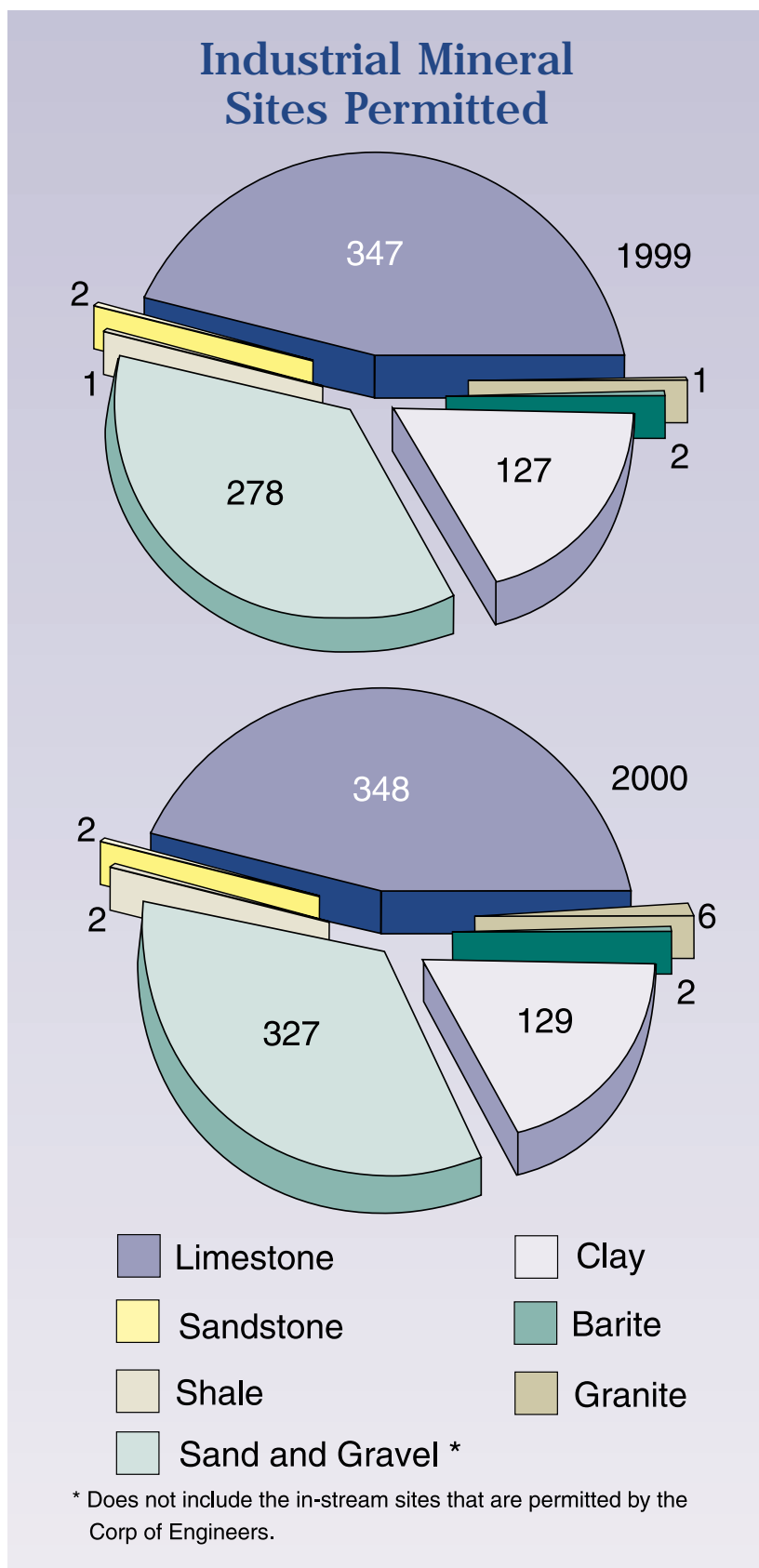


Table 5



*Active limestone quarry site in Jasper County. See photo of site after reclamation on page 15.*

ting procedures. Each year, citizens living near proposed mines request six to ten public hearings on the issuance of permits. Because of the precise criteria established in the *Land Reclamation Act*, the Land Reclamation Commission has been prohibited from granting any hearings, until the first request for a hearing was approved in May 1998. The hearing, which was conducted to review whether or not a limestone-mining permit should be granted for a location in Lincoln County, occurred mid-fiscal year 1999. At the time of the issuance of this report the issuance of the permit has been held pending the outcome of the appeals process.

It is probable that requests for hearings, which require a tremendous amount of staff time to address, will become increasingly common as mining companies look to open sites in and close to heavily populated areas. New sites and expansions to existing sites are requested in order to provide building commodities to meet the needs and demands of ongoing and new construction. It is likely that sometime in the future, changes may need to be implemented to associated statutes, rules or internal policies in order for the Land Reclamation Program to better respond to the needs of the environment, the unregulated community and the mining companies of industrial mineral-related issues. As of the date of this report preparation, changes concerning the public participation into the permitting process are being considered by the Land Reclamation Commission.

Routinely, the concerns brought to the commission are about issues outside the regulatory authority provided to the program through the *Land Reclamation Act*. These issues include concerns about blasting, safety on public roads and the mine's effect on property values. Even so, the commission has encouraged all citizens who have requested hearings under the proper circumstances to personally appear at regularly scheduled public meetings to express their concerns. While the constraints in the laws have prohibited the commission from denying permits, this regular contact with the public has brought an acute awareness to the commission about what is most troubling to the citizens. In return, the public has an opportunity to learn more about the reclamation requirements under the *Land Reclamation Act*. Continued contact of this sort will certainly help pave the way for the citizens to resolve their concerns about mining.

## Industrial Minerals Inspection

The state is divided into seven geographic regions with one inspector assigned to each area. Since these inspectors have to conduct other duties related to the permitting of industrial minerals operations and inspections of coal mines they are limited to the amount of industrial minerals inspections they can perform in a given year. The operations range in size from 300-plus acre limestone quarries to small one-acre gravel pits.

During fiscal year 1999, 291 inspections were conducted on industrial mineral sites and in fiscal year 2000, 316 inspections were conducted. The 607 inspections conducted during 1999 and 2000 represent a slight increase over the number of inspections conducted during 1997 and 1998.

Inspections typically fit into one of three categories: regular inspection, complaint inspection or bond release inspection. Regular inspections are conducted to determine if an operator is in compliance with the approved permit and the applicable performance requirements of the *Land Reclamation Act*. Performance requirements checked by inspectors include timeliness of reclamation, safety barriers, lateral support, erosion and siltation control, grading, topsoil handling and revegetation. Inspectors also evaluate each mine site to ensure that all mining disturbance is confined to the permitted and bonded area and that the approved post-

mining land uses are being established. Complaint inspections are conducted after the Program receives notification from the public that an industrial minerals operation may be in violation of the *Land Reclamation Act*. Complaints filed by citizens may involve blasting, noise, truck traffic, water pollution, erosion or siltation. Following an investigation, the inspector and operator are often successful in resolving a citizen's complaint in a timely manner. However, many public complaints related to mining operations, such as blasting, noise and truck traffic are not regulated by the LRP and are referred to the appropriate regulatory authority.

Bond release inspections are conducted at the operator's request when reclamation has been completed. The focus of the bond release inspection is to determine if the mine site has been reclaimed in accordance with the reclamation plan. The inspector also must evaluate if the operator has established the designated post-mining land use(s). Post-mining land uses may be designated as wildlife habitat, agricultural, development or water impoundment. When mined land is properly reclaimed, a recommendation for bond release is made to the Land Reclamation Commission. If approved, the reclamation bond is released back to the operator. The Commission approved the release of 321 acres of reclaimed mine land in 1999 and 354 acres in 2000.

## Industrial Minerals Enforcement

The enforcement powers of the Land Reclamation Commission were enhanced in two significant ways by revisions made in 1990 to the *Land Reclamation Act*. The commission may impose administrative penalties when notices of violation are issued and they have the option of referring civil actions to the Cole County Court rather than the county in which the violation occurred. These revisions have resulted in more prompt and vigorous action by the violators to eliminate violations.

Often violations observed during an inspection are eliminated through the use of conference, conciliation and persuasion. The process encourages the operator to correct a non-compliance through voluntary action and is used normally in cases of relatively minor non-compliance. If attempts to correct a violation through conference, conciliation and persuasion are not successful, a notice of violation is issued to the operator.

Table 4, on Page 9, displays the notices of violation issued to industrial mineral operators during 1999 and 2000. While 28 violations were issued during 1997 and 1998, 47 were issued during 1999 and 2000. The increase in enforcement activity may be attributed to the increase in the number of inspections conducted and the increased experience of the inspection staff. Of the 47 notices issued during 1999 and 2000, 20 were administrative in nature and 27 were operational violations of the performance requirements. Administrative violations often involve mining without a valid permit or mining outside of the permitted area. Notices of violations related to performance requirements include the failure to control off-site sedimentation, erosion, improper topsoil handling, and the failure to meet safety barrier requirements.

An increased number of site inspections at industrial minerals operations carry the potential for an increase in enforcement activity during the coming year. Industrial mineral operators who are not thoroughly familiar with the requirements of the *Land Reclamation Act* risk inadvertent non-compliance. Only through close coordination with Land Reclamation Program personnel are potential enforcement actions avoided or minimized.

## In-Stream Sand and Gravel Mining

One of the most prevalent types of mining in Missouri, as far as the number of sites, is the "in-stream" removal of sand and gravel. Numerous operators across the entire state use sand and gravel deposits (called gravel or sand "bars") as a source of aggregate material.

During the 1990s this activity underwent several changes in regulatory control within Missouri. In the early 1990s, the Land Reclamation Program was the permitting and enforcement authority that both issued permits for this type of mining activity and also oversaw the proper removal of sand and gravel from Missouri's streams. In the mid 1990s, the regulation of this activity was taken up by the Army Corps of Engineers, who basically took over the process of permitting and inspecting these mining facilities. The Army Corps of Engineers lost their jurisdiction over this activity in late 1998, owing to a ruling by the U.S. District Court of Appeals. The court found that "de-minimus" or incidental fall



*Jasper County limestone quarry site after reclamation.*

back of sand and gravel into the stream from which it was being excavated did not constitute the placement of fill by the mining operation. Hence, the court ruled that the Army Corps of Engineers had exceeded their authority in requiring a permit for this activity.

In January 1999, the Land Reclamation Program resumed the former position of the regulatory authority over this type of mining activity and bases this authority upon the provision of the state's Land Reclamation Act. Approximately 150 permits were re-issued to the mining industry during the early months of 1999 by the Land Reclamation Program to take the place of the existing Army Corps of Engineer's permits. This responsibility continues to the present day on the part of the Land Reclamation Program with approximately 200 mining permits issued

## Industrial Mineral Bond Forfeiture

The *Land Reclamation Act*, which went into effect Jan. 1, 1972, initially permitted and regulated the mining of limestone, clay, barite, tar sands, sand and gravel in the Missouri. As part of that regulation, the companies and individuals so engaged were obligated to put up a reclamation performance bond

in the amount of \$500 per acre for every permitted acre. Should the individual or company fail to perform the required reclamation the bonds were then forfeited and the state was to complete the reclamation.

The bonding amount was subsequently found to be inadequate to cover reclamation costs, as well as other inadequacies in the *Act*, and the *Act* was amended effective Aug. 28, 1990. The amendment added additional minerals to those already regulated and increased the reclamation bonding to a minimum bond of \$8,000 for

up to eight acres and \$500 for every acre permitted thereafter.

Between 1972 and 1990, 26 sites operated by 14 different companies became bond forfeiture sites and the responsibility of the LRP to properly reclaim. To date, of those 26, all but four have been reclaimed, or re-permitted, bonded and reclamation liability assumed by other companies or individuals. Ten industrial mineral sites were granted reclamation liability releases during 1997 and 1998 by the Land Reclamation Commission. Of those 10 sites, five sites totaling 11 acres were re-permitted by other companies that assumed the existing reclamation liabilities. The other sites, totaling 23 acres were reclaimed as pasture, ponds and wildlife habitat. In 1999, one sand and gravel mine in Jefferson County walked away from their operation and forfeited the reclamation bond for the site. This site is approximately six acres in size and will be reclaimed to a water impoundment and wildlife area by the Land Reclamation Program.



# Metallic Mineral Activities

## Metallic Minerals Permitting

**I**n 1991, the department issued 11 permits to operators under the *Metallic Minerals Waste Management Act* (MMWMA). During 1999 and 2000, the LRP continued the five year review of the metallic minerals waste management permits. In addition to these reviews, the LRP also received and application from the Doe Run Company to reactivate a mine in Perry County near the town of Higdon. This application is currently under review by the LRP and other programs within the Department. The mine is expected to produce cobalt along with lead and zinc.

Metallic Minerals Waste Management permit applications consist of financial assurance information and detailed waste management area closure and inspection-maintenance plans. The plans establish and explain the technical steps proposed to accomplish and maintain closure after mining and waste disposal is completed. Issues addressed in the plans include the following:

During the ongoing permit application review, LRP is coordinating with the other Department of Natural Resources Programs involved with the metallic minerals waste management areas. These agencies include the Division of Environmental Quality's Air Pollution Control Program, Water Pollution Control Program, Solid Waste Management Program, Public Drinking Water Program, Hazardous Waste Program and the Division of Geology and Land Survey. The coordination process will allow the other programs to review and comment on the technical aspects of the plans so that all department issues may be incorporated into the permit.

## Metallic Minerals Inspection

Inspections are performed semi-annually on the 11 metallic minerals waste management permit areas within Missouri. During the course of these inspections, all aspects of each company's permits are evaluated. The main focus of these inspections is to assess the company's compliance with virtually every environmental law that is administered by the Missouri Department of Natural Resources. LRP is entrusted as the coordinating agency within the department for each active metallic mineral producer currently operating in Missouri. It is the program's responsibility to act as the liaison for the other programs within the department and each metal producer to ensure continuing compliance with all applicable state environmental laws.

Actual on-the-ground reclamation does not begin at these sites until mineral production is stopped, and mine closure begins. Only one lead producer in Missouri is in closure at the present time. Cominco American's Magmont Mine ceased production in 1995 and began the actual reclamation

1. the design and construction of waste control structures and tailings dams;
2. the characterization of waste products;
3. the methods for control and protection of surface water;
4. the methods for protection of groundwater and aquifers;
5. the geology and seismicity of the area;
6. the potential of subsidence;
7. the reuse and off-site removal of wastes; and
8. the surface reclamation of waste management areas.

*Lead Tailings  
reclamation at  
Cominco America's  
Magmont Mine in  
Iron County.*



of the surface effects of almost 30 years of lead mining and processing.

The first phase of the Cominco reclamation project involves covering the 300-acre tailings impoundment with clay material from adjacent land. During 1999 and 2000, the company finalized the covering and grading of the tailings area and continued to monitor surface and groundwater in the region. With the dual objective of erosion control and the establishment of wildlife habitat, the company has conducted revegetation efforts on the entire waste management area. During the closure phase, Cominco has planted a diverse mix of grasses, legumes, shrubs and over 60,000 native trees. With technical assistance from the Missouri Department of Conservation, the company has designed and implemented a land use plan that will benefit native wildlife including deer, turkey and bobwhite quail.

## **Metallic Minerals Enforcement**

To date, the enforcement of the provisions of the MMWMA has not been necessary by the LRP. Enforcement under this law is significantly different from enforcement under either the coal or industrial minerals units of the program. If it should become necessary to issue a citation to any of the metal producers, the authority to do so rests solely with the director of the Department of Natural Resources. Enforcement is only authorized by law after attempts to eliminate the violation through conference, conciliation and persuasion have been exercised and exhausted. In early 2000, the department filed a request with the Attorney General's office to initiate a suit against a company for failing to provide the department with adequate financial assurance for each of their nine permitted areas. This suit is currently under review by the department's and Attorney General's legal staff.

# Abandoned Mine Land Activities

Since the early 1840s, coal mining has at times been a major industry in the north, central and southwest portions of Missouri. Up to six million tons of coal were mined annually in the first three decades of the 20<sup>th</sup> century. Because mining companies gave little or no thought to the post-mining value of the land, some 67,000 acres of land were left abandoned prior to passage of Missouri's first strip-mine legislation in 1971. Although nature has adequately reclaimed much of this land over the years, more than 10,000 acres have been identified that require reclamation work to correct a wide range of public health, safety and environmental problems. These problems include safety hazards such as steep and unstable highwalls and embankments, open mine shafts, abandoned mining equipment and facilities, dangerous impoundments and unsanitary trash dumps. Acid mine drainage and sedimentation from exposed coal waste and mine spoils also pollute and clog streams. Subsidence, caused when old underground mines collapse, may damage overlying buildings.

Abandoned mine land (AML) reclamation took a giant step forward when the U.S. Congress enacted Public Law 95-87, the *Surface Mining Control and Reclamation Act of 1977* (SMCRA). The *Act* outlined specific requirements for the reclamation of lands mined after May 2, 1977, and established programs and funding for reclaiming abandoned mine lands. In January 1982, Missouri received approval from the federal Office of Surface Mining (OSM) to operate the AML program and conduct reclamation work in the state.

## AML Inventory and Reclamation Project Ranking and Selection

Public Law 95-87 requires that the highest priority abandoned coal mine sites be reclaimed before problems created by mining other commodities are addressed. Therefore, Missouri presently only reclaims problems caused by past coal mining. The information pertaining to Missouri's abandoned coal mine lands is contained in the AML Inventory. This database currently contains 215 coal mine problem sites and is continually updated as existing site conditions change or new sites are identified. The order in which abandoned coal mine land is reclaimed is initially determined by classifying the problem sites into three broad priority categories. Priority I and II problem sites are reclaimed first since they pose a threat to the public health and safety. Priority III problem sites adversely affect the environment and may be addressed after all priority I and II sites are reclaimed. On an annual basis, the unfunded Priority I and II problem sites are ranked and selected for future reclamation work according to the severity of existing problems. To date, an estimated \$83.1 million in Priority I and II and \$64.4 million in Priority III AML problems have been inventoried in Missouri. Of these totals, \$41.6 million in Priority I and II and \$60.9 million in Priority III AML problems remain unfunded.

*Unstable, barren and eroding mine lands pose a threat to public safety and degrade water quality.*



## AML Grant Funding

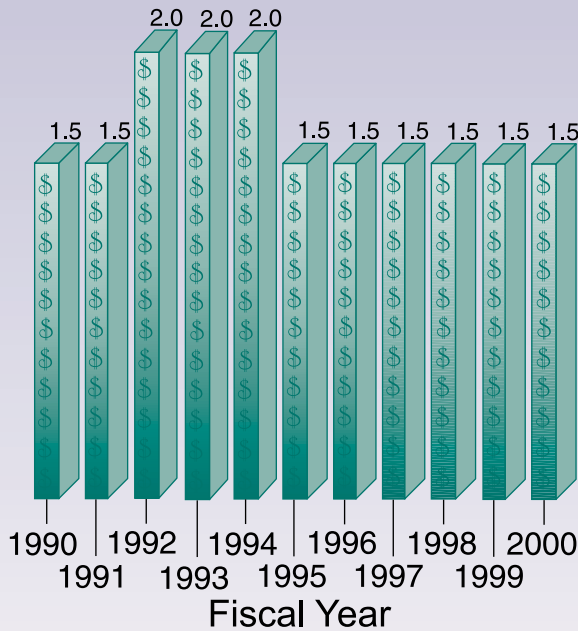


Table 6

## AML Funding Summary (through 6/30/00)

Total Administrative Grants	\$7,225,736
Total Construction Grants	\$30,357,251
Total Consolidated AML Grants	\$15,884,777
Total Future Set-Aside Grants	\$35,394
Total Cooperative Agreements	\$8,145,861
Fiscal Year 1983 Rural Abandoned Mine Program (RAMP) Grant	\$812,371
<b>Subtotal for Missouri AML State and Federal Projects</b>	<b>\$62,461,390</b>
Federal Emergency Projects	\$16,800
Federal Contracts	\$28,314
RAMP Projects by Soil Conservation Service	\$926,543
Subtotal for Other Federal Projects	\$971,657
<b>Total All Activities</b>	<b>\$63,433,047</b>

Table 7

## AML Reclamation Funding

The AML activities of LRP are funded by the U.S. Department of Interior's Office of Surface Mining Reclamation and Enforcement AML reclamation fund. All of the money in the fund is collected from active coal mining companies through fees charged on the tonnage of coal mined since passage of SMCRA. The fund is distributed to the eligible states and American Indian tribes by the Office of Surface Mining Reclamation and Enforcement. To date, Missouri has received \$62.4 million in AML grants and cooperative agreements from the fund to conduct reclamation work in Missouri. However, because of steadily declining coal production since the late 1980s, Missouri and other Midwestern states have received decreasing allocations. In 1987, the U.S. Congress established an annual minimum base funding level in the amount of \$2 million to allow states with significant abandoned coal mine problems but limited coal production to continue their AML programs. However, the \$2 million minimum base amount has consistently been reduced to \$1.5 million in the federal appropriations process (Tables 6 and 7). Missouri has an excellent record for obligating the funds received. Through state fiscal year 2000, 97 percent of all grants received have been contractually obligated for the completion of reclamation projects.

## AML Reclamation Accomplishments

LRP has made much progress toward reclaiming Missouri's most severe abandoned coal mine problems. Ninety reclamation projects, totaling 3,796 acres have been completed. Engineering designs are being prepared for 10 additional reclamation projects covering 268 acres. These formerly barren and acidic wastelands are being reclaimed to productive uses such as pasture, forage and wildlife habitat. Tables 8 and 9 provide details as to the types and numbers of problems reclaimed. Despite these notable accomplishments, an additional 7,800 acres remain to be reclaimed as grant funding becomes available.



## AML Feature Projects Bear Creek

The Bear Creek project is located in Henry County, 2.5 miles northeast of Montrose, MO. Reclamation included backfilling approximately 2,300 feet of dangerous highwall at two sites, one mile apart. The North Site had two highwalls on both sides of a county road, totaling 600 feet long. The South Site had two highwall sections of 1200 and 400 feet in length. The highwalls were actively eroding the road shoulder creating a public hazard. A culvert placed under the county road by the mining company was eroding and posed a hazard to the public.

The design called for the backfilling and stabilization of the eroding highwalls and road culvert to reduce public road hazards. Construction was completed in June 1999. One highwall was the end of a strip pit that required the use of a rock-filled base forming a hard point to hold backfilled spoil in place. A highwall at the South Site was backfilled while creating a shallow pool. The pool is connected to the existing strip pit and creates a nursery habitat for young fish.

A total of 18 acres were reclaimed at the Bear Creek project. To promote wildlife habitat the 10-acre South Site was planted with a warm season, native grass and forb mixture. The eight-acre North Site was planted to a cool season mixture. Total cost for the Bear Creek project was \$244,293.

## AML Reclamation Accomplishments Through 6/30/00

AML Problems:	Reclaimed	Under Const. or Design	Total
AML Projects(#)	90	11	101
Mine Openings (#)	142	19	161
Highwall (ft.)	84,071	8,850	92,921
Hazardous Facilities (#)	31	2	33
Subsidence (ac.)	3	0	3
Surface Burning (ac.)	19	0	19
Underground Mine Fire (ac.)	2	0	2
Unsanitary Trash Dumps (ac.)	73	2	75
Dangerous Piles/Embankments (ac.)	541	89	630
Clogged Streams (mi.)	10.8	0.0	10.8
Clogged Stream Lands (ac.)	1,518	65	1,583
Polluted Water: Human Consumption, Agricultural or Industrial (#)	49	2	51
Hazardous Impoundments (#)	17	0	17
Polluted Impoundments (ac.)	89	8	97
Spoil (ac.)	1,339	105	1,444
Gob (ac.)	142	1	143
Slurry (ac.)	69	0	69
<b>Total AML Acreage</b>	<b>3,796</b>	<b>270</b>	<b>4,066</b>

Table 8

## Bill's Coal/Moore's Branch Reclamation Project

The Bill's Coal/Moore's Branch project is located in Vernon County, 15 miles southwest of Nevada. The project consists of two adjacent, but separate surface coal mine sites that were reclaimed under a single construction contract for reasons of efficiency and cost-effectiveness. The Moore's Branch site was a 26-acre abandoned mine land (AML) site that was strip-mined for coal prior to 1977. The Bill's Coal site was a 629-acre permitted mine site that was abandoned by the coal mine operator in 1988 prior to completing reclamation.

## AML Reclamation Accomplishments

### 7/1/98 through 6/30/00

#### FINAL DESIGN COMPLETIONS:

Project Name	County	Acres	AML Problems *
7126 Bruno Subsidence	St. Louis	1	Exploratory Drilling 1 building
6629 Marmaduke Subsidence	St. Louis, City	1	Exploratory Drilling 1 home
5340 Neosho Subsidence	St. Louis, City	1	Exploratory Drilling 1 home
Hickory Hill Shafts	Bates	1	2 VOs
North Weyer Shafts	Macon	2	4 VOs, WA
Turner / Valle	Barton/Dade	15	DH
Turner Shafts	Barton	1	6 VOs
Upper Cedar Creek CSI/319	Boone/Callaway	1	PWAI
Bucklin Gob	Linn	5	DPE
	<b>Total Acres</b>	<b>28</b>	

#### CONSTRUCTION CONTRACT AWARDS:

Project Name	County	Acres	AML Problems *
Bear Creek	Henry	18	DH, SA
5573 Mardel Subsidence	St. Louis, City	1	Drilling/Grouting 1 home
1472 Gregg Subsidence	St. Louis, City	1	Drilling/Grouting 1 home
7126 Bruno Subsidence	St. Louis	1	Exploratory Drilling 1 building
5340 Neosho Subsidence	St. Louis, City	1	Exploratory Drilling 1 home
Hickory Hill Shafts	Bates	1	2 VOs
Hidden Valley Shaft	Callaway	1	1 VO
North Weyer Shafts	Macon	2	4 VOs, WA
Turner / Valle	Barton/Dade	15	DH, SA, GO
	<b>Total Acres</b>	<b>42</b>	

#### CONSTRUCTION CONTRACT COMPLETIONS:

Project Name	County	Acres	AML Problems *
Bear Creek	Henry	18	DH, SA
5573 Mardel Subsidence	St. Louis, City	1	Drilling/Grouting 1 home
1472 Gregg Subsidence	St. Louis, City	1	Drilling/Grouting 1 home
7126 Bruno Subsidence	St. Louis	1	Exploratory Drilling 1 building
6629 Marmaduke Subsidence	St. Louis, City	1	Exploratory Drilling 1 home
5340 Neosho Subsidence	St. Louis, City	1	Exploratory Drilling 1 home
Fulton	Callaway	26	PWAI, DH, DPE, 6 VOs
Hickory Hill Shafts	Bates	1	2 VOs
Hidden Valley Shaft	Callaway	1	1 VO
Turner / Valle	Barton/Dade	15	DH, SA, GO
	<b>Total Acres</b>	<b>66</b>	

\* Key to AML problem abbreviations:

VO - vertical opening  
P - portal  
DH - dangerous highwall  
DPE - dangerous piles or embankments  
CS - clogged stream conditions  
WA - water problems (acid mine drainage and sedimentation)

IRW - industrial or residential waste dump  
SA - spoil area  
SL - slurry (coal waste)  
GO - gob (coal waste)  
PWAI - polluted water agricultural/industrial

Table 9

The Bill's Coal site was abandoned when the mining company went into bankruptcy. At that point, the surety for the mining company became obligated to complete the reclamation or else forfeit the bonds so that reclamation could be accomplished by the state. When the surety subsequently became insolvent, the state was only able to collect \$47,100 to complete the reclamation. Cost estimates indicated that approximately \$1.7 million would be needed to complete the reclamation, and only \$1.3 million was available in the state's coal bonding pool fund for this project. The bonding pool was established to provide additional assurances to the state that monies to complete reclamation at coal mining sites would be available in the event that a surety had inadequate funds or became insolvent. Active coal mining operations contribute monies to the bonding pool fund based on their production levels. Since this was an AML-eligible insolvent surety site, AML state share monies were used to make up for the bonding insufficiency and allow reclamation work to proceed.

The Moore's Branch site contained 26 acres of barren spoils with scattered areas of coal wastes. The site posed a public safety hazard since local residents used the steep and eroding piles and embankments for ATV and motorcycle hill climbing. The public health and safety problems at the Bill's Coal site included dangerous piles and embankments, dangerous highwalls, barren mine spoils and unauthorized trash dumping. Approximately 450 acres of the site required grading and revegetation.

The Bill's Coal/Moore's Branch Project was successfully completed in the spring of 1998. Approximately 476 acres were reclaimed to cool-season pasture as well as a number of livestock/wildlife impoundments. The total construction cost was \$1,794,481, of which \$133,569 was used to reclaim the Moore's Branch AML site and \$409,203 was used to reclaim the AML-eligible portion of the Bill's Coal insolvent surety site. In May 1998, an additional \$9,500 was spent to permanently seed the Moore's Branch site with a warm-season native grass and cool-season grass mixture. In July 1998, a liability release was granted on 152 acres of the Bills Coal site by the Land Reclamation Commission. The remainder of the site is expected to be released in 2001.

## Fulton Reclamation Project

The Fulton Reclamation Project is located in Callaway County, approximately one mile west of Fulton, MO. The Bevier coal seam was underground mined from the late 1800s through the middle 1920s.

Numerous shafts are located throughout the region. Refractory clay was also mined with the coal. During the 1920s and 1930s, the remaining coal along the creek and some of the coal pillars were strip-mined.

Reclamation work included grading spoil, consolidating and burying gob, backfilling six vertical openings and constructing fence and guardrail barriers along a highwall to reduce public safety hazards. The vertical openings were filled trash and debris. These materials were not stable, resulting in periodic collapses and reopening of the shafts. Trash and debris were removed and disposed of in a landfill. Rock was placed in the shafts prior to covering with soil.

Sediment and acid mine drainage from eroding stream banks and barren gob piles was seriously degrading a tributary of Stinson Creek. Poor water quality impaired the stream's ecological diversity and limited use by landowners. Approximately 1/2-mile of streambank was stabilized using rock-filled wire baskets called revetment mattresses. The mattresses were secured and anchored to the ground to create a rock blanket armoring the streambank. Eight small coal waste piles, called gob, were either covered in place or were hauled to a central repository. Acid-forming gob was covered with soil and revegetated.

Approximately 26 acres were reclaimed by the autumn of 1998 at the Fulton project. Nine acres of the project site were seeded with warm-season, native grasses and forbs. Seventeen acres were seeded to cool-season grasses and legumes. Total reclamation cost for the Fulton project was \$630,744.

## Turner/Valle Project

The Turner/Valle Reclamation Project is composed of two sites. The Turner site is located 10 miles northeast of Lamar in northeastern Barton County, while the Valle site is located 12 miles east of Lamar in western Dade County. These areas were mined during the late 1800s and the early

1900s using underground room and pillars with portal entryways. Between the 1920 and 1960, many of the ridgetops in the area were surface mined.

The Turner site contained two small surface pits totaling 10 acres. Reclamation resulted in one dangerous highwall being backfilled for a length of 1,000 feet. The highwall was adjacent to a private driveway and within 300 feet of two homes. A pond that discharged acid mine drainage was filled. Approximately 150 cubic yards of eroding coal waste was limed and buried. A 1.6-acre pond was constructed onsite to provide wildlife habitat and recreational uses. Mitigation wetlands were created in the pond and in an adjacent swale to replace wetlands lost during construction.

The Valle Site consisted of five acres of spoil and acidic ponds. Acid mine drainage and acidic sediments were exiting the mine lands and degrading water quality in a nearby farm pond. The site was graded, returning the site to approximate original contour. Approximately 200 cubic yards coal waste was treated with agricultural lime and buried.

*Reclamation at the Turner site of the Turner/Valle Reclamation Project eliminated a highwall adjacent to a house.*

Reclamation was completed by the autumn of 1999 at the Turner/Valle Project. The upland area of the Turner site was seeded with cool-season grasses and legumes. Grass species tolerant of saturated soils were planted in the wetlands. The Valle site was seeded with a mixture of cool-season and warm-season grasses. Total reclamation cost for the Turner/Valle project was \$116,573.



## Upper Cedar Creek Clean Streams/ 319 Project

Missouri AML has initiated a cooperative reclamation project to address water quality problems associated with abandoned mine lands in the Cedar Creek watershed forming the border between Boone and Callaway counties in central Missouri. Cedar Creek is listed on the Missouri 303(d) list of impaired waters that do not meet standards required under the Clean Water Act. AML is receiving money from two alternative funding sources to address acid mine drainage (AMD) problems in the Cedar Creek watershed. The Office of Surface Mining has contributed almost \$390,000 under their AML Clean Streams Initiative to LRP to address state AML water quality issues. The department's Water Pollution Control Program (WPCP) has awarded an additional \$70,000 of EPA funds with a 319 grant. LRP is using traditional AML funds for additional maintenance work and to provide matching money for the EPA grant.

LRP has entered an agreement with the USGS Midwest Science Center to document Cedar Creek ecosystem recovery. Other important partners include: WPCP, Boone County Soil Water Conservation District, OSM, EPA, USDA Natural Resource Conservation Service, Missouri Department of Conservation, and the Columbia Audubon Society.

The Upper Cedar Creek watershed was the one of the worst AML environmental problems in the Midwest. Periodic discharges of AMD and acidic sediments severely degraded water quality in Cedar Creek and resulted in numerous fishkills from 1948 until 1980. On several occasions, the entire 44 miles of stream was made lifeless. Only the flow of the Missouri River diluted the pollution impact. The entire creek bottom was mined through, accentuating water quality problems.

In the 1980s, LRP completed three projects, reclaiming 706 acres in the Upper Cedar Creek watershed. Total cost was \$4.7 million. The final of the three was the 404-acre Upper Cedar Creek project, completed in 1990 at a cost of \$2.3 million. Cedar Creek water quality has been greatly improved since reclamation with the likelihood of the mine-related fishkills greatly reduced.



Thirty-one acres were amended and seeded in the spring of 2000 to native grasses for erosion control and wildlife habitat. An additional 35 acres were seeded in 1997. Over 100,000 tree seedlings have been planted in the last 10 years.

The main emphasis of the current project is to improve Cedar Creek water quality. The minelands are extremely acid-forming with high concentrations of pyrite. Flooding in the 1990s caused significant damage to the streambanks at UCC and released additional acid-forming sediments into Cedar Creek. Much of the proposed work is to repair this damage and limit future flooding impacts.

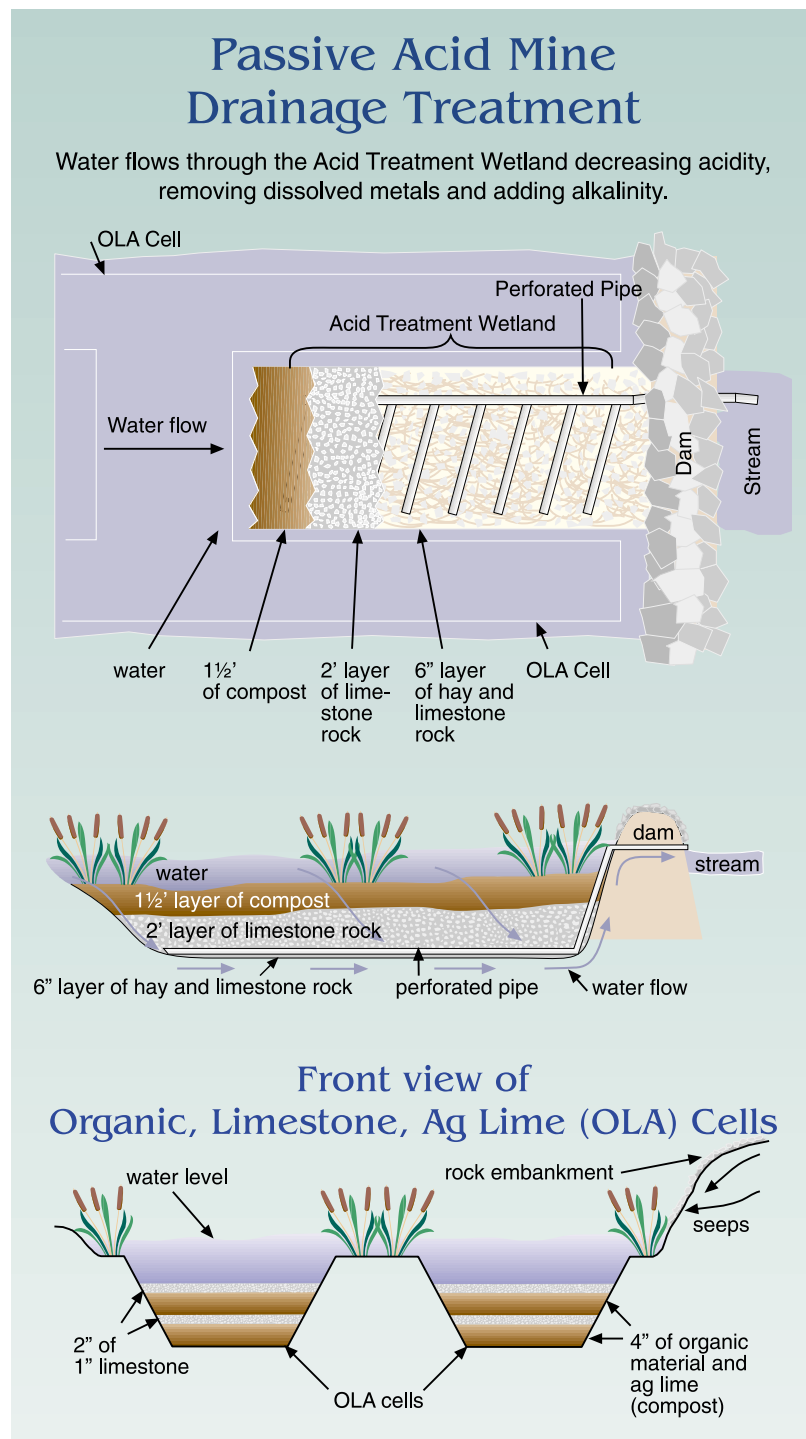
Planned work for the project includes repairing damaged streambanks to mitigate flood damage and restore riparian environmental quality. Two streambanks were repaired 1997 and 1999. Native trees and shrubs will be used to restore riparian zones. Wetlands and alkaline producing cells will be built to treat AMD and remove dissolved metals. Acidic hotspots that are eroding and causing sedimentation and stabilization problems will be repaired, amended and reseeded. Heavy agricultural lime applications are required. Native grasses will be used to improve wildlife habitat.

All major construction will be completed by the fall of 2001, with additional plantings proceeding into 2002. Additional streambank repair is planned on two additional areas under a separate construction contract.

## Missouri's AML Emergency Program

In March 1998, the LRP submitted a proposed amendment to its state AML reclamation plan that allowed Missouri to assume the administration of the AML emergency program on behalf of OSM. The amendment was approved by OSM in June 1998. Administrative procedures and guidelines for conducting the emergency program were completed in September 1998. Consequently, beginning with fiscal year 1999, the LRP is responsible for investigating all emergency complaints in Missouri and conducting reclamation work when emergencies are declared.

An AML emergency is a sudden event related to past coal mining that has a high probability of causing substantial harm. There also must be a



need to abate the emergency more quickly than would be possible under normal AML program operations. Sometimes an emergency complaint constitutes an eligible coal mine problem but the situation does not meet the emergency criteria. In this case, reclamation work could still be undertaken by the LRP under the normal AML program. The proposed reclamation project, however, would be

*Constructed wetlands at Upper Cedar Creek treat acid mine drainage and improve water quality.*



## Non-Coal Reclamation

Under SMCRA, state and tribal AML programs must give priority to reclamation of abandoned coal mines. However, Section 409 of the Act provides that, at the request of the Governor of the state or the head of the tribal body, non-coal reclamation projects may be undertaken on a case-by-case basis before the priorities related to past coal mining have been fulfilled. Reclamation of such non-coal AML sites must be necessary for the protection of the public health, safety and general welfare from extreme danger, thereby meeting Priority I problem criteria. To date, the LRP has not reclaimed any non-coal AML sites under Section 409 of the Act.

*Severe floods in the 1990s damaged stream banks. The Upper Cedar Creek Clean Streams/319 Project will repair stream banks and build wetlands to reduce acid mine drainage in central Missouri.*

subject to the project ranking and selection process and would have to compete for available grant funds along with other priority I and II problem sites.

During fiscal year 1999 and fiscal year 2000 the LRP conducted five emergency investigations but no emergencies were declared. All of these emergency investigations related to possible mine subsidence in the City of St. Louis. These emergency investigations consisted of staff evaluating the suspected area with regard to past coal mining and known geological conditions. If these evaluations indicated that mine subsidence was possible exploratory drilling was conducted. Several drill holes would be drilled in or near the suspected area. These drill holes would inform LRP of the depth and extent of mining and would provide information of the stability of the rock and soil layers above the mining. In these five investigations LRP determined that past underground coal mining was not the cause of the settling that was occurring. The causes of the settling most likely were due to poor storm water drainage or shrinking of clay material below the structure foundation. If it was determined that collapsing coal mining voids were present, a contractor would have been mobilized to fill the voids with grout. The grout is a mixture of cement, sand and flyash. This mixture is pumped into the mining void to provide stability so any future subsidence will be greatly reduced.

In fiscal year 2000 the LRP received approval from the Missouri Land Reclamation Commission to utilize AML Funds for closure of Priority I non-coal shafts. At this time LRP is obtaining an eligibility opinion from the Attorney General's Office regarding the use of AML funds to provide closure for 19 vertical openings. Once this is obtained LRP will work with the Department's administration and the Governor's Office to obtain the formal request from the Governor. LRP expects to complete this task by late spring, 2001 so construction work on the closures can be initiated during the summer.

During fiscal years 1998 and 1999 the LRP was involved in a joint project with the department's Hazardous Waste Program (HWP) to demonstrate reclamation techniques at abandoned lead/zinc sites in Jasper and Newton counties. The HWP received grant funds from the U. S. Environmental Protection Agency to conduct the demonstration work and the LRP has utilized the funds to complete construction activities. The LRP and the HWP staffs jointly completed the design work for the sites. The LRP, utilizing local contractors, completed the earthmoving activities, soil amendments and seeding on approximately 55 acres of mine tailings. Additionally, ten dangerous mine shafts were filled or sealed as part of this demonstration work in Jasper and Newton counties.

# Environmental Indicator

## Reclaiming Mined Land

**H**ealth, safety and environmental problems associated with mining include acid runoff, soil erosion, abandoned shafts and other unsafe conditions. The Missouri Department of Natural Resources is responsible for minimizing the environmental and health-related impact of mining activities. Of the 194,139 acres of Missouri land disturbed by mining activities, 68,839 acres have been reclaimed or will be reclaimed. Of the remaining 125,300 acres, 55,400 acres of abandoned coal mine lands will not be reclaimed because they are naturally stabilized and are not a threat to public health or the environment. The remaining 69,900 acres are metallic and industrial minerals sites that have no funding available for reclamation.

Missouri coal is surface-mined. Sites that were mined before laws were in place to protect the land were generally left as they were, with acid- and toxic-forming materials exposed. Today, mining companies are required to backfill the overburden into the pits and bury the acid- and toxic-forming materials and replace the topsoil. This restores the land to a productive use.

Industrial minerals are generally mined in a similar fashion. However, the amount of overburden is much less, and the mineral deposit is much thicker.

Metallic minerals are deep mined through elevator shafts constructed to the deposit. The ore is removed from the rock through a flotation process. The waste rock materials, called tailings, are sluiced to the huge ponds or piles. Before environmental protection laws were in place, tailing piles were simply left when the ore deposit was depleted. The mines filled with water and, in some cases, had open shafts exposed. The tailings were left to

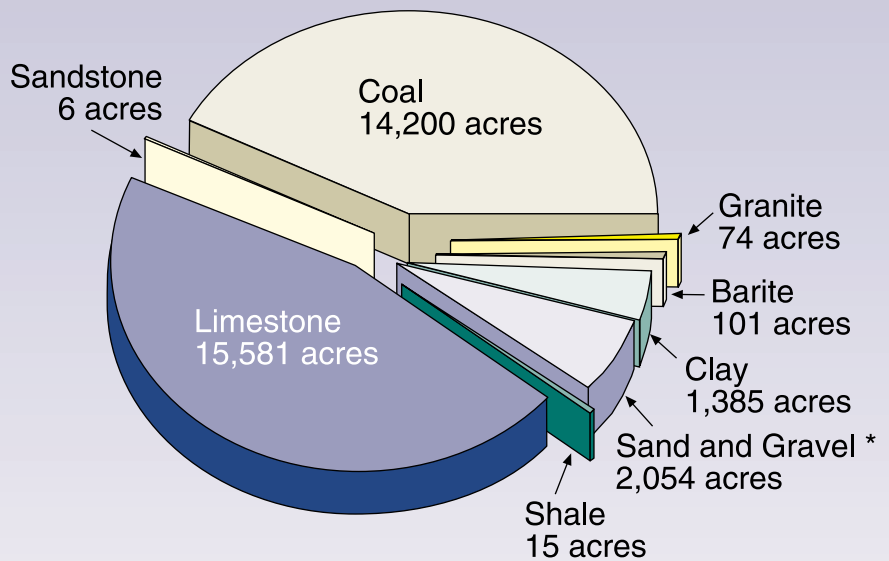
wind and water erosion, which resulted in serious air and water pollution problems.

Today, all mining companies are required to provide financial assurance through reclamation bonds. These bonds ensure that sites are properly graded, revegetated and maintained after mining ceases.

## Challenges To Missouri's Land

Another challenge is reclamation of lands disturbed by mining and abandoned by the mining operators before environmental protection laws were passed. Only abandoned coal mine lands are eligible for federal Abandoned Mine Land cleanup funding, and these funds are very limited. Some abandoned lead- and zinc-mined lands may be eligible for cleanup under federal law. The other abandoned mine land sites, including lead, zinc, barite, limestone, clay, sand, gravel and some other commodities, will remain unreclaimed until funding is available.

### Acreage of Land Reclamation Sites Permitted in 1999



\* Does not include the in-stream sites that are permitted by the Corp of Engineers.

# Land Reclamation Information

## Missouri AML Technical Assistance Bulletins - Landowner Management Guide for Minelands

1. Strip Pit Management and Neutralization
2. Cool-Season Grass Stand Management on Reclaimed Minelands
3. Warm-Season, Native Grasses on Reclaimed Minelands
4. Establishing and Managing Warm Season, Native Grasses on Reclaimed Minelands
5. Tree Planting on Missouri Minelands
6. Tree Species for Missouri Minelands

Also available:

Missouri Department of Natural Resources  
Abandoned Mineland informational flyer.

For further assistance or to obtain copies of these publications please contact the Abandoned Mine Land Section, Missouri Department of Natural Resources, P.O. Box 176, Jefferson City, MO 65102, (573) 751-4041.

### Information on the Internet

#### Missouri Department of Natural Resources

Land Reclamation Program

(<http://www.dnr.state.mo.us/deq/lrp>)

Technical Assistance Program

(<http://www.dnr.state.mo.us/deq/tap>)

General DNR Department Information

(<http://www.dnr.state.mo.us>)

The Complete Missouri Mining Law

(<http://www.moga.state.mo.us/statutes/c444.htm>)

#### U.S. Department of Interior Office of Surface Mining

Office of Surface Mining (OSM)(Washington D.C.)

(<http://www.osmre.gov/osm.htm>)

OSM - Mid-Continent Regional Coordinating Center

(Alton, IL) - ([www.mcrcc.osmre.gov](http://www.mcrcc.osmre.gov))

#### Other Mining and Reclamation Organizations

National Association of Abandoned Mine Land Programs

(<http://www.onenet.net/~naamlp/>)

Interstate Mining Compact Commission

(<http://www.imcc.isa.us>)

National Association of State Land Reclamationists

(<http://www.siu.edu/~coalctr/naslr.htm>)



## Missouri Department of Natural Resources Land Reclamation Program

P.O. Box 176

Jefferson City, MO 65102-0176

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